MYCOLOGIA

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ILLUSTRATIONS OF FUNGI—XXXI

WILLIAM A. MURRILL

The three species of gill-fungi shown on the accompanying plate are all edible and conspicuous by reason of their size or brilliant coloring. It is unfortunate that more space is not available for their adequate representation.

Cortinarius alboviolaceus (Pers.) Fries

PALE-VIOLET CORTINARIUS

Plate 13. Figure 1. × 1

Pileus fleshy, bell-shaped to convex with a broad umbo, gregarious, 3–6 cm. broad; surface smooth, dry, shining, appressed-silky, pale-violaceous to caesious-buff, soon becoming silvery-white with a violet tint; margin persistently decurved; context caesious or violet-tinted, of mild flavor; lamellae adnate to emarginate or slightly decurrent, rather broad, crowded, pale-violet to ashy-purplish when young, soon becoming paler and at length cinnamon-brown, eroded-crenulate on the edges; spores ellipsoid, rusty-brown, variable in size, slightly roughened, 6.5–9 × 4–5 μ; stipe tapering upward from a thickened base, spongy-stuffed, 4–8 cm. long, 5–20 mm. thick, violaceous above, usually peronate by the universal veil, which is thin, soft, white, appressed, and silky-interwoven.

This pretty, pale-violet species is common in late summer and autumn among leaves or humus in thick woods throughout most of temperate North America and Europe. It grows gregariously and is abundant enough to use for food. I have often eaten it in

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the Adirondacks and elsewhere. Insects are very fond of it. When dried, specimens become so much paler that they are hardly recognizable.

Pholiota squarrosoides Peck

SHARP-SCALE PHOLIOTA

Plate 13. Figure 2. × 1

Pileus fleshy, firm, subglobose when young, at length convex, usually densely cespitose, 3–10 cm. broad; surface whitish, viscid when moist, adorned with erect, pointed, terete, tawny scales more abundant on the disk; context white, rather thick, edible; lamellae adnate or arcuate, often sinuate with age, rather narrow, crowded, whitish, becoming brownish-ferruginous; spores short-ellipsoid to ovoid, smooth, rusty-brown, 5–5.5 × 2.5–3.5 μ; cystidia scattered, about 30 μ long, obtuse at the apex; stipe equal, solid or stuffed, smooth and white above, rough below with numerous recurved, tawny scales; annulus floccose, lacerate.

This species was carefully studied by Dr. Peck in the Adirondacks, where he found it growing in clusters on dead logs and stumps of the sugar maple, and more rarely on beech and a few other deciduous trees. According to him, the flesh is firm and of excellent flavor. Prof. Hard found it in Ohio late in the fall, reporting it as especially frequenting hollow stumps and logs of the sugar maple. Dr. Kauffman reports it as frequent in certain parts of Michigan, occurring in very dense clusters on living trunks of maple, birch, and beech, as well as on dead logs and stumps of various deciduous trees.

According to Dr. Peck, it may be distinguished from the European species, *Pholiota squarrosa* Müll., by its "viscid pileus, its compact, erect, pointed scales, its sinuate lamellae and its brownish ferruginous spores." He reports *P. squarrosa* as not very common, occurring in dense tufts on dead wood in August and September.

According to Dr. Kauffman, *Pholiota squarrosa* differs from *P. squarrosoides* in the "color of the young gills, the disagreeable odor, the yellow flesh, the crocus-yellow or tawny color, and the larger, smoother spores."

I have a young specimen from Redding, Connecticut, collected

by Earle, who described it as "white with brown scales." This matches Peck's specimens of *P. squarrosoides* at Albany exactly. I also have larger specimens, which I collected in 1912 on a sugar maple log on the grounds of the Lake Placid Club. These resemble typical *P. squarrosoides* in appearance and grew on its usual host, but they had the strong, unpleasant odor of the European *P. squarrosa,* which can never be forgotten when once experienced.

I went out on a short collecting trip to the south of Upsala, Sweden, on the afternoon of October 12, 1910, and found a large cluster of *P. squarrosa* in the hollow trunk of a partly dead *Salix alba.* The caps were large and covered with large, erect scales, and the stems were very long. It agreed perfectly with specimens in the Fries Herbarium and also with specimens from Bresadola. I took the plants to my room at the hotel and placed them about the porcelain stove to dry while I slept; for the weather was cold and snowy and the stove contained a little fire. I lay down and tried to sleep, but all night long there was that strong, disagreeable odor in my nostrils, unlike anything I had ever smelt before. I can remember it yet; and I have had no difficulty in recalling it when I collected specimens with the same odor since.

On September 23, 1912, I was out collecting with Mr. Field at Stockbridge, Massachusetts, when I found by the roadside at the base of an apple-tree a large, dense cluster of mushrooms, which I called *P. squarrosa* at the time because they had the same strong odor experienced in Sweden. The taste was watery and not particularly unpleasant. I brought the cluster home and Miss Eaton made from it the drawing shown on the accompanying plate.

Melanoleuca Russula (Scop.) Murrill

Tricholoma Russula Gill.

REDDISH MELANOLEUCA

Plate 13. Figure 3. × 1

Pileus fleshy, convex, becoming plane or centrally depressed, obtuse, solitary or subcespitose, 7.5–12.5 cm. broad; surface viscid when moist, smooth or dotted with granular squamules on the disk, pale-pink or rose-red suffused at times with yellowish stains

or purplish streaks; margin usually paler, involute and minutely downy in the young plant; context white, sometimes tinged with red, the taste mild; lamellae subdistant, rounded behind or subdecurrent, white or yellow, often becoming red-spotted with age; spores ellipsoid, 6–7.5 × 4 μ; stipe solid, firm, dry, white, often reddish below, squamulose at the apex, 3–7 cm. long, 1.5–2.5 cm. thick.

This species was figured in *Mycologia* for September, 1915, the form there represented having a pale-pink surface with yellowish stains, and white gills. The form here shown is much redder and the gills are yellowish. The plant is frequent, either growing singly or in clusters, under oaks or in mixed woods in the northeastern United States, although not abundant enough to consider for table use. Dr. Peck agrees with McIlvaine that it is delicious; and it certainly has that appearance. The name refers to its resemblance to *Russula*, but the context is firm and not vesiculose, while the spores are very distinct. Mrs. Delafield found the deep-red form at Buck Hill Falls, Pennsylvania, in August of this year and sent in a specimen of it to the Garden herbarium.

NEW YORK BOTANICAL GARDEN.

THE OCCURRENCE OF BULGARIA PLATYDISCUS IN CANADA

A. W. McCallum

(With Plate 14)

Between May 9 and 15 of this year, collections of a rather rare and remarkable fungus were made at Val de Bois, P. Q., in the valley of the Lièvre River by Mrs. R. A. Inglis and Mrs. H. T. Güssow. The plants which were collected—15 to 20 in number—were gregarious in habit, occurring within the space of a few square feet, and nowhere else could others be found. They were growing beneath some coniferous trees in a bed of needles and humus, and from a distance they appeared like small stumps of young black birches—perfectly flat tops from one to two inches above the ground. At this time they were immature.

When the plants were received at this laoratory, several were placed in a moist chamber and allowed to come to maturity. In size, the apothecia varied from 6–10 cm. in width by 4–8 cm. in height. They were globose, sessile, dull-brownish-black in color, spongy in texture and furrowed both vertically and horizontally. Attached to the base were a few fine, branched, rhizomorph-like strands. The exterior of the apothecia was covered by a dense, felty layer of dark-brown hyphae, up to 400 μ in length and 10 μ in diameter, multiseptate and somewhat constricted at the septa. These hyphae arose from the outer side of a single row of very dark brown, rounded, pseudoparenchymatous cells. Arising from the inner side of this same row of cells, and forming a tangled network in the colorless jelly-like mass which occupied the whole interior of the apothecia, were innumerable, slender, hyaline hyphae, 4–5 μ in diameter. These assumed the most fantastic tendril-like forms and showed very curious connections. A spiral formation of these hyphae was very common. Probably their function is to give stability to the jelly-like contents of the apo-

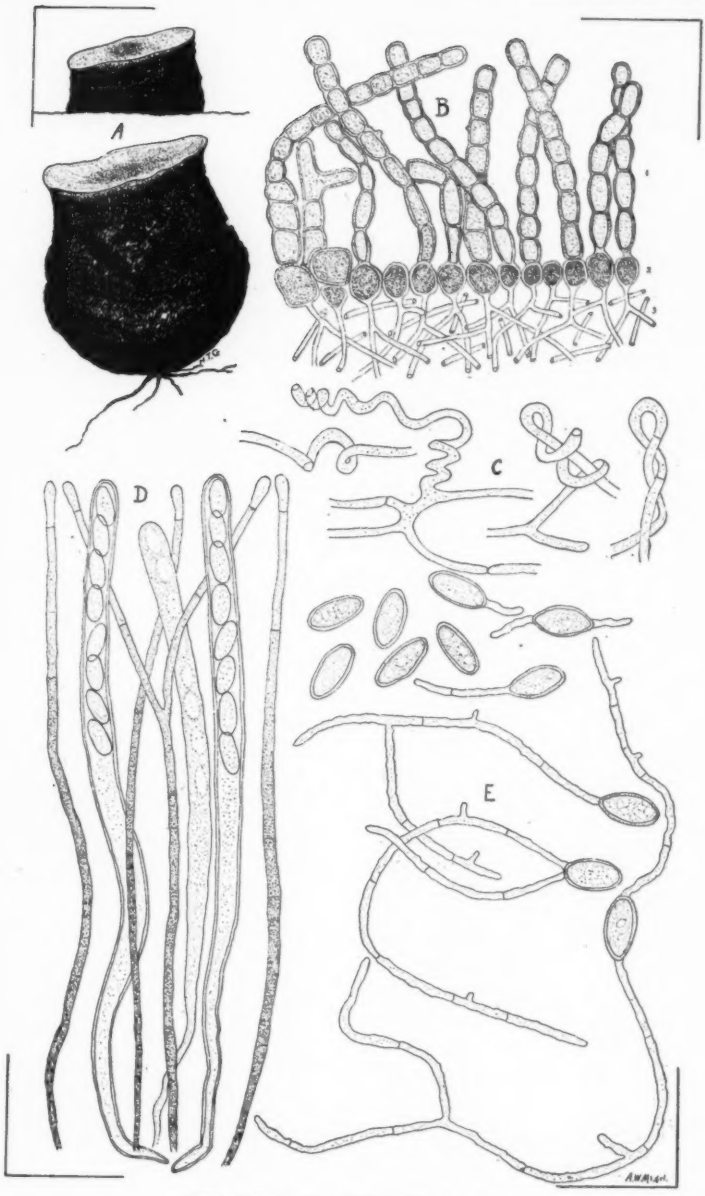
thecia and the spiral and other irregular formations are to allow for expansion of the apothecia due to growth. The hymenium was deep-olive-green to black in color, velvety in texture, sinuate in outline and slightly concave. The asci were cylindrical, rounded at the tops, up to 425 μ long, 15 μ broad, and 8-spored. The spores were ellipsoid, smooth, subhyaline, 1-celled, 28–34 μ by 11–15 μ, uniseriate. The paraphyses were septate, rarely branched, colorless and slightly swollen at the tips, downward becoming brown, 5 μ in diameter.

In an attempt to obtain pure cultures of the fungus, poured plates of nutrient media were placed over pieces of the hymenium which were discharging spores, but every plate became contaminated, probably because foreign organisms became attached to the spores as they passed out through the tips of the asci. This, however, did not prevent a study of the germination of the spores, which occurred in 12–15 hours. Two different media were used —potato agar and Czapek's agar.[1] Upon the latter the germination percentage was very high and almost in every case it was bipolar, while upon the potato agar the germination percentage was low and usually but one germ tube was produced. The high germination percentage resulting from the use of Czapek's agar suggests its use in the case of spore germination in certain of the higher fungi where the spores are very resistant. The spores also germinated freely in tap water, though usually but one germ tube was produced.

[1] Distilled water ..... 1000.00 c.c. Ferrous sulphate ..... 0.01 gr.
Magnesium sulphate ... 0.50 gr. Sodium nitrate ..... 2.00 gr.
Dipotassium phosphate. 1.00 gr. Cane sugar ..... 30.00 gr.
Potassium chloride .... 0.50 gr. Agar ..... 15.00 gr.

Regarding the systematic position of this form, the writer believes that he is correct in naming it *Bulgaria platydiscus* Casp. It agrees very closely with the admirable description of *Sarcosoma globosum* var. *platydiscus* Casp. given in Rabenhorst.[2] In the appendix of this volume, Rehm writes of *Sarcosoma platydiscus* Casp.: "Nachdem die Beschreibung von *S. globosum* völlig verschiedene Sporen erweist, ist dieser Pilz also selbst-

[2] Rehm in Rabenhorst's Kryptogamen-Flora 5: 98. 1896.



BULGARIA PLATYDISCUS CASP.

ständige Art zu erachten." The spore measurements given for *S. globosum* are 8–10 μ long and 5–6 μ wide. Sarcosoma and Bulgaria are synonymous.

CENTRAL EXPERIMENTAL FARM,
OTTAWA, CANADA.

EXPLANATION OF PLATE 14

A, young and mature apothecia of *Bulgaria platydiscus*; *B*, section through the wall of the apothecium showing (1) the felty layer of brown, multiseptate hyphae, (2) the single row of rounded, pseudoparenchymatous cells, and (3) the network of hyphae which permeates the jelly-like contents of the apothecium; *C*, drawings to show a few of the curious forms assumed by the hyphae in *B*, 3; *D*, asci and paraphyses, the tips of the latter slightly club-shaped; *E*, some mature spores and various stages in their germination.

ADDITIONS TO LICHEN DISTRIBUTION IN NORTH AMERICA

Bruce Fink

Some of the material which has been accumulating in my herbarium for many years has not been published. By far the greater portion of this is mainly of interest to those for whom the determining was done, but somewhat more than 200 species are worth recording as additions to distribution.

Many of the species recorded in this paper were collected by the writer, on the islands of Puget Sound, during a sojourn of six weeks at the Seaside Station of the University of Washington, in the summer of 1906, with headquarters at Friday Harbor, on San Juan Island. On the return trip, a week was spent at Glacier, British Columbia, and Laggan, Alberta. At these two places high elevations were reached, and much interesting material was secured, part of which is recorded in this paper. Little has been recorded definitely for any of these places in way of lichen distribution, though the areas are covered in a general way, for many of the species, in Tuckerman's Synopsis.

For several years the writer determined lichens collected by L. H. Pammel in the western mountains. Colton Russell sent specimens from Missouri and other western states many years ago. T. C. Frye sent a considerable number from the Olympic Mountains in Washington, and E. T. Harper has added to the list by collections from several areas. Several other botanists and zoölogists have added somewhat to the list published herein.

The list follows, given for distribution, and divested of all other non-essential data. Where no collector is named, the collecting was done by the writer.

Acarospora cervina (Wahl.) Koerb.

Waldron Island in Puget Sound, 1906, rocks.

Acarospora chlorophana (Wahl.) Ach.

Socorro County, New Mexico, Coll. C. J. Herrick, 1895, and near Glacier, British Columbia, 1906, rocks.

Acarospora fuscata (Schrad.) Arn.
Islands of Puget Sound, 1906, rocks.
Acarospora glaucocarpa (Wahl.) Ach.
San Juan Island in Puget Sound, 1906, limestone.
Acarospora glebosa Koerb.
Boone County, Iowa, 1903, sandstone.
Acolium tympanellum (Ach.) DeNot.
Islands of Puget Sound and near Glacier, British Columbia, 1906, bark and decorticate wood. Thallus often poorly developed.
Amphiloma lanuginosum (Hoffm.) Nyl.
San Juan Island in Puget Sound, 1906, and Madison County, Kentucky, 1908, various shaded substrata, in moist places.
Arthonia impolita (Ehrh.) Borr.
San Juan Island in Puget Sound, 1906, red cedar wood.
Arthopyrenia gemmata (Ach.) Mass.
Stewart's Island in Puget Sound, 1906, maple bark.
Arthopyrenia glabrata (Ach.)
San Juan Island in Puget Sound, 1906, bark.
Arthopyrenia quinqueseptata (Nyl.) Fink.
Boone County, Iowa, 1903, bark.
Bacidia akompsa (Tuck.) Fink.
Islands of Puget Sound, also Longmire Springs, Washington, Coll. E. T. Harper, 1906, bark.
Bacidia dryina (Ach.).
Islands of Puget Sound, 1906, cedar bark.
Bacidia schweinitzii (Tuck.) Fink.
Missouri and Arkansas, Coll. Colton Russell, 1899, bark.
Biatorella clavus (Lam. & DC.) Th. Fr.
Colorado mountains, Coll. L. H. Pammel, 1904, rocks.
Biatorella geophana (Nyl.).
Islands of Puget Sound, 1906, moist clay.
Biatorella pruinosa (J. E. Smith) Fink.
Cole County, Missouri, Coll. Colton Russell, 1898, shaded rocks.
Biatorella simplex (Dav.) Br. & Rostr.
Iron County, Missouri, Coll. Colton Russell, 1898, shaded rocks.
Biatorina bahusiensis (Blomb.).
Near Laggan, Alberta, Coll. Carolyn Crosby, 1901, rocks.
Biatorina chalybeia (Borr.) Mudd.
Near Minneapolis, Minnesota, 1896, limestone.
Biatorina cyrtella (Ach.) Nyl.
Near Duluth, Minnesota, 1898, poplar bark.
Biatorina laureri (Hepp.).
Islands of Puget Sound, 1906, bark.
Biatorina prasina (Fr.) Fink.
Shushan, New York, Coll. Frank Dobbin, 1907, bark.
Biatorina tricolor (With.) Fink.
Islands of Puget Sound, 1906, bark and wood. Inconspicuous and seldom collected.

Bilimbia hypnophila (Ach.) Th. Fr.

San Juan Island in Puget Sound, 1906, mosses over rocks.

Buellia colludens (Nyl.) Tuck.

Madison County, Missouri, Coll. Colton Russell, 1906, exposed sandstone.

Buellia leptocline (Flot.) Mass.

Islands of Puget Sound, 1906, rocks. Little known in North America.

Buellia papillata (Sommerf.) Tuck.

Near Laggan, Alberta, 1906, mosses at 9,000 feet.

Buellia stellulata (Tayl.) Br. & Rostr.

San Juan Island in Puget Sound, 1906, rocks.

Buellia turgescens (Nyl.) Tuck.

San Juan Island in Puget Sound, 1906, old boards.

Calicium curtum Borr. & Turn.

San Juan Island in Puget Sound, 1906, dead wood.

Calicium hyperellum Ach.

Near Glacier, British Columbia, 1906, bark of conifers. Not often collected in North America.

Cetraria aculeata (Schreb.) Fr.

Islands of Puget Sound, 1906, soil over rocks. Widely distributed over exposed rocks of this region.

Cetraria arctica (Hook.) Tuck.

Near Glacier, British Columbia, 1906, soil over rocks at 9,000 feet.

Cetraria chlorophylla (Humb.) Wain.

Islands of Puget Sound, 1906, dead bark and wood.

Cetraria cucullata (Bell) Ach.

Near Glacier, British Columbia, and Laggan, Alberta, 1906, soil among rocks.

Cetraria fendleri Tuck.

Socorro County, New Mexico, Coll. C. J. Herrick, 1898, twigs. The type locality is in New Mexico, where collected by Fendler, in 1856.

Cetraria glauca (L.) Ach.

San Juan Island in Puget Sound, near Glacier, British Columbia, 1906, and from National Park, Montana, Coll. M. E. Jones, 1910, trees.

Cetraria juniperina (L.) Ach.

San Juan Island in Puget Sound, 1906, Cascade Mountains, Washington, Coll. T. C. Frye, 1907, and Utah, Coll. L. H. Pammel, 1907, bark and dead wood.

Cetraria madreporiformis (Ach.) Muell.

Near Glacier, British Columbia, and Laggan, Alberta, 1906, soil at high elevations.

Cetraria nivalis (L.) Ach.

Near Laggan, Alberta, 1906, at 8,500 feet. Also Yahulat Island, Alaska, Coll. Trevor Kincaid, 1897, and Albany County, Wyoming, Coll. Aven Nelson, 1901, soil.

Cetraria orbatum (Nyl.).

Islands of Puget Sound, 1906, trees. A little-known lichen described from California as *Platysma orbatum* Nyl.

Cetraria platyphylla Tuck.

Islands of Puget Sound, 1906, trees. Common throughout this area.

Cetraria stenophylla (Tuck.).

Islands of Puget Sound, 1906, trees. Widely distributed in this area.

Cetraria tenuifolia (Retz.) Howe.

At the Palisades on the north shore of Lake Superior in Minnesota, 1897, Isle Royale in Lake Superior, 1902, and near Glacier, British Columbia, 1906, soil.

Cetraria terrestris (Schaer.).

Near Glacier, British Columbia, and Laggan, Alberta, 1906, soil.

Chaenotheca brunneola (Ach.) Muell.

Islands of Puget Sound, 1906, cedar bark. Not well known in North America.

Cladonia apolepta (Ach.)

Islands of Puget Sound, 1906, and Washington County, New York, Coll. S. H. Burnham, 1907, old wood in moist places.

Cladonia bacillaris (Del.) Nyl.

San Juan Island in Puget Sound, 1906, logs.

Cladonia bellidiflora (Ach.) Schaer.

Islands of Puget Sound, and near Glacier, British Columbia, 1906, soil over rocks.

Cladonia carneola Fr.

Islands of Puget Sound, and near Glacier, British Columbia, 1906, soil.

Cladonia cenotea (Ach.) Schaer.

Near Glacier, British Columbia, and Laggan, Alberta, 1906, soil.

Cladonia chlorophaea (Gaud.) Spreng.

Essex County, New York, Coll. Carolyn W. Harris, 1899, and Islands of Puget Sound, 1906, soil.

Cladonia coccifera (L.) Willd.

Islands of Puget Sound, and near Glacier, British Columbia, 1906, soil.

Cladonia cornuta (L.) Schaer.

Near Laggan, Alberta, 1906, soil.

Cladonia crispata (Ach.) Schaer.

San Juan Island in Puget Sound, 1906, soil over rocks.

Cladonia deformis (L.) Hoffm.

Near Glacier, British Columbia, and Laggan, Alberta, 1906, soil and old wood.

Cladonia degenerans (Floerke) Spreng.

San Juan Island in Puget Sound, 1906, soil.

Cladonia denticollis Hoffm.

San Juan Island in Puget Sound, 1906, Cape Breton Island, Coll. G. E. Nichols, 1909, New Brunswick, Coll, G. B. Kaiser, 1910, soil and old wood.

Cladonia digitata (Ach.) Nyl.

San Juan Island in Puget Sound, and near Laggan, Alberta, 1906, soil.

Cladonia ecmocyna (Ach.) Nyl.

Islands of Puget Sound, near Glacier, British Columbia, 1906, Lo Lo Hot Springs, Montana, Coll. M. J. Elrod, and in the Olympic Mountains, Washington, Coll. T. C. Frye, 1907, soil.

Cladonia gracilescens (Floerke) Wain.
Islands of Puget Sound, near Glacier, British Columbia, and near Laggan, Alberta, 1906, soil.

Cladonia gracilis (L.) Willd.
Islands of Puget Sound, 1906, soil over rocks.

Cladonia leporina Fr.
Hot Springs, Arkansas, Coll. Colton Russell, 1899, rocks.

Cladonia macilenta Hoffm.
San Juan Island in Puget Sound, 1906, old board fence.

Cladonia palamaea (Ach.).
San Juan Island in Puget Sound, 1906, soil over rocks.

Cladonia pityrea (Floerke) Wain.
Fayette County, Iowa, 1896, old wood.

Cladonia pyxidata (L.) Hoffm.
St. Louis County, Missouri, Coll. Colton Russell, 1897, and Lincoln County, New Mexico, Coll. S. F. Earle, 1910, soil.

Cladonia squamosa (Scop.) Hoffm.
Islands of Puget Sound, 1906, old wood.

Cladonia subcariosa Nyl.
Tacoma Park, D. C., Coll. Mabel E. Williams, and Lookout Mountain, Tennessee, Coll. W. W. Calkins, rocks. Distributed as *Cladonia symphycarpa* Fr. in Lichenes Boreali-Americani no. 178, and in W. W. Calkins' North American Lichens, nos. 85 and 94.

Cladonia subulata (L.).
Islands of Puget Sound, 1906, old logs.

Cladonia subsquamosa (Nyl.) Wain.
Islands of Puget Sound, 1906, Chechalis County, Washington, Coll. J. C. Tillman, 1907, and Mt. Hood, Oregon, Coll. T. C. Frye, 1907, soil and old wood.

Cladonia sylvatica (L.) Rabenh.
Islands of Puget Sound, 1906, soil over rocks.

Collema plicatile Ach.
Islands of Puget Sound, 1906, shaded limestone.

Coniocybe furfuracea (L.) Koerb.
Islands of Puget Sound, and Laggan, Alberta, 1906, bark.

Coniocybe pallida (Pers.) Fr.
Waldron Island in Puget Sound, 1906, oak bark.

Dermatocarpon arboreum (Fr.) Fink.
St. Louis County, Missouri, Coll. Colton Russell, 1897, bark.

Dermatocarpon fluviatile DC.
Brown Island in Puget Sound, and near Glacier, British Columbia, 1906, Wet rocks.

Dermatocarpon hepaticum (Ach.) Th. Fr.
Wayne County, Missouri, Coll. Colton Russell, 1898, soil.

Everina furfuracea (L.) Mann.
Rincon Mountains, Arizona, Coll. J. C. Blumer, 1909, dead pines.

Everina vulpina (L.) Ach.
Waldron Island in Puget Sound, and near Laggan, Alberta, 1906, bark.

Gyrophora angulata (Tuck.) Herre.

Grand Marais, Minnesota, 1901, Islands of Puget Sound, and near Glacier, British Columbia, 1906, and Olympic Mountains, Washington, Coll. T. C. Frye, 1907, rocks.

Gyrophora cylindrica (L.) Ach.

Near Glacier, British Columbia, at 9,500 feet, and Laggan, Alberta, at 5,400 feet, 1906, rocks.

Gyrophora deusta (L.) Borr. & Turn.

In several localities on islands in The Lake of the Woods and along the northern boundary of Minnesota, 1899 to 1902, rocks. The plants are sterile and were not determined until recently. Tuckerman included this species with *Gyrophora proboscidea* (L.) Ach.

Gyrophora hyperborea Ach.

Top of Mt. Constitution in Puget Sound, near Glacier, British Columbia, and near Laggan, Alberta, 1906, rocks at 2,000 to 8,500 feet.

Gyrophora phaea (Tuck.) Herre.

Stewart Island in Puget Sound, 1906, rocks.

Gyrophora polyphylla (L.) Fr.

Islands of Puget Sound, 1906, rocks.

Gyrophora rugifera (Nyl.) Th. Fr.

Beaver Creek, Colorado, 11,900 feet, Coll. L. H. Pammel, 1895, Olympic Mountains, Washington, 8,500 feet, Coll. T. C. Frye, 1907, and San Francisco Peaks, Arizona, Coll. H. C. Cowles, rocks.

Gyrophora vellea (L.) Ach.

Golden Colorado, Coll. L. H. Pammel, 1895, Lo Lo Hot Springs, Montana, Coll. M. J. Elrod, 1897, and Clear Water, Idaho, Coll. L. H. Pammel, 190, rocks.

Heppia despreauxii (Mont.) Tuck.

Jefferson County, Missouri, Coll. Colton Russell, 1898, and Colorado City, Colorado, Coll. H. L. Shantz, 1904, soil.

Icmadophila aeruginosa (Scop.) Mass.

Islands of Puget Sound, and near Glacier, British Columbia, and Laggan, Alberta, 1906, old logs and stumps.

Lecanora albescens (Hoffm.) Th. Fr.

San Juan Island in Puget Sound, 1906, old boards. Previously unknown in North America, unless the same as *Lecanora hageni* (Ach.) Koerb.

Lecanora atra (Huds.) Ach.

Iron County, Missouri, Coll. Colton Russell, 1900, rocks.

Lecanora boligera (Norm.) Hedl.

Near Glacier, British Columbia, Coll. Carolyn Crosby, 1901, bark. Not previously reported from North America.

Lecanora cinerea (L.) Summerf.

Islands of Puget Sound, near Glacier, British Columbia, and near Laggan, Alberta, 1906, rocks.

Lecanora cinereorufescens (Ach.) Fr.

Near Glacier, British Columbia, 1906, rocks at 6,000 feet. Little known in North America.

Lecanora diffracta (Ach.)

Islands of Puget Sound, 1906, rocks.

Lecanora frustulosa (Dicks.) Ach.
Brown Island in Puget Sound, 1906, rocks.

Lecanora heteromorpha Ach.
Near Glacier, British Columbia, 1906, rocks.

Lecanora hypnorum (Wulf.).
Near Glacier, British Columbia, 1906, mosses.

Lecanora Pacifica Tuck.
San Juan Island in Puget Sound, 1906, wood and bark.

Lecanora pallescens (L.) Schaer.
Missoula, Montana, Coll. M. J. Elrod, 1899, San Juan Island in Puget Sound, 1906, and Olympic Mountains, Washington, and Mt. Hood, Oregon, Coll. T. C. Frye, 1907, bark and mosses.

Lecanora pallida (Schreb.) Schaer.
San Juan Island in Puget Sound, 1906, bark.

Lecanora rabenhorstii (Hepp).
Fayette County, Iowa, 1897, limestone.

Lecanora rubina (Lam. & DC.) Ach.
Iron County, Missouri, Coll. Colton Russell, 1898, rocks.

Lecanora sordida (Pers.) Th. Fr.
Islands of Puget Sound, and near Glacier, British Columbia, 1906, rocks.

Lecanora subattingens (Wain.).
San Juan Island in Puget Sound, 1906, board fences. Not previously reported from North America.

Lecanora tartarea (L.) Ach.
Iron County, Missouri, Colton Russell, 1900, and Islands of Puget Sound, 1906, bark and rocks.

Lecanora ventosa (L.) Ach.
Near Glacier, British Columbia, and Laggan, Alberta, 1906, and Olympic Mountains, Washington, Coll. T. C. Frye, 1907, rocks.

Lecanora verrucosa (Ach.) Laur.
Near Glacier, British Columbia, 1906, soil and mosses.

Lecidea atrobrunnea (DC.) Schaer.
Beaver Creek and LaMotte Peak, Colorado, Coll. L. H. Pammel, 1896 and 1900, Pikes Peak, Colorado, Coll. E. T. Harper, and near Glacier, British Columbia, 1906, rocks.

Lecidea caeruleonigricans (Lightf.) Schaer.
Isla Ryale, Michigan, 1902, rocks.

Lecidea confluens (Ach.) Nyl.
Near Glacier, British Columbia, 1906, rocks.

Lecidea cinnabarina Sommerf.
Islands of Puget Sound, 1906, boards. Known from only a few North American areas.

Lecidea fossarum Duf.
Sulphur Springs, Colorado, Coll. E. Bether, 1913, soil. An inconspicuous lichen, the distribution of which is not well known.

Lecidea fuscoatrata Nyl.
Islands of Puget Sound, 1906, rocks. Previously known only from the type locality in California.

Lecidea fuscorubens Nyl.
San Juan Island in Puget Sound, 1906, rocks. Not previously reported from North America.
Lecidea goniophila (Floerke) Koerb.
West Lake Fork, Utah, Coll. L. H. Pammel, 1900, and Waldron Island in Puget Sound, 1906, rocks.
Lecidea granulosa (Hoffm.) Ach.
Near Glacier, British Columbia, 1906, soil.
Lecidea latypea Ach.
Islands of Puget Sound, 1906, rocks.
Lecidea lutescens (Hellb.) Stiz.
Plummers Island, Maryland, 1907, rocks. Not previously reported from North America.
Lecidea morio Schaer.
Utah, Coll. L. H. Pammel, 1907, rocks.
Lecidea parvifolia Pers.
Butler County, Missouri, Coll. Colton Russell, 1898, bark.
Lecidea platycarpa Ach.
Waldron Island in Puget Sound, near Glacier, British Columbia, and near Laggan, Alberta, 1906, rocks.
Lecidea pringlei Tuck.
Near Laggan, Alberta, 1906, rocks at 9,000 feet.
Lecidea quernea (Dicks.) Ach.
Brown Island in Puget Sound, 1906, dead wood.
Leptogium albociliatum Desf.
Stewart Island in Puget Sound, 1906, soil.
Leptogium lecerum (Retz.) S. F. Gray.
Waldron Island in Puget Sound, 1906, bark.
Leptogium muscicola (Sw.) Fr.
Islands of Puget Sound, 1906, mosses.
Leptogium myochroum (Schrad.) Tuck.
Islands of Puget Sound, 1906, rocks and bark.
Leptogium palmatum (Huds.) Mont.
Islands of Puget Sound, 1906, mossy rocks.
Lopadium fuscoluteum (Dicks.) Mudd.
Longmire Springs, Washington, Coll. E. T. Harper, 1906, bark.
Lopadium phyllocharis (Mont.).
Gainesville, Florida, Coll. F. M. O'Byrne, 1912, leaves.
Megalospora sanguinaria (L.) Koerb.
Islands of Puget Sound, and near Glacier, British Columbia, 1906, bark.
Micarea denigrata (Fr.) Hellb.
San Juan Island in Puget Sound, 1906, bark.
Nephroma arctica (L.) Fr.
Near Glacier, British Columbia, and Laggan, Alberta, 1906, soil.
Nephroma laevigata Ach.
Near Glacier, British Columbia, 1906, rocks.
Nephroma lusitanica Schaer.
Islands of Puget Sound, 1906, rocks.

Nesolechia punctum Mass.

Fayette County, Iowa, 1902, on *Cladonia mitrula* Tuck.

Pannaria brunnea (Sw.) Mass.

Islands of Puget Sound, and near Glacier, British Columbia, 1906, soil and mosses.

Pannaria hypnorum (Hoffm.) Koerb.

St. Paul's Island, Alaska, Coll. Trevor Kincaid, 1897, and Paradise Valley, Washington, Coll. E. T. Harper, 1906, mosses and soil.

Pannaria lepidiota (Sommerf.) Th. Fr.

Mt. Hesperus, Southern Colorado, 11,000 feet, Coll. Baker, Earle, and Tracy, 1898, Islands of Puget Sound, 1906, and Longmire Springs, Washington, Coll. E. T. Harper, 1906, rocks and bark.

Pannaria leucosticta Tuck.

Madison and Iron counties, Missouri, Coll. Colton Russell, 1898, rocks.

Pannaria microphylla (Sw.) Mass.

Iron and Waine counties, Missouri, Coll. Colton Russell, 1898, rocks.

Parmelia albescens (Schaer.).

Near Glacier, British Columbia, and Laggan, Alberta, 1906, decorticate wood.

Parmelia alpicola Th. Fr.

Near Laggan, Alberta, 1906, rocks at 9,000 feet.

Parmelia ambigua (Wulf.) Ach.

Islands of Puget Sound, near Glacier, British Columbia, and near Laggan, Alberta, 1906, decorticate wood.

Parmelia centrifuga (L.) Ach.

Near Glacier, British Columbia, 1906, rocks.

Parmelia lanata (L.) Wallr.

Uintah Mountains, Utah, at 12,000 feet, Coll. L. H. Pammel, 1901, and near Laggan, Alberta, 1906, rocks at 9,200 feet.

Parmelia molliuscula Ach.

Laramie County, Colorado, Coll. Mrs. C. F. Baker, 1895, Laramie, Wyoming, Coll. Aven Nelson, 1895, South Dakota, Coll. W. P. Carr, 1902, and North Dakota, Coll. L. R. Waldron, 1904, soil.

Parmelia omphalodes (L.) Ach.

Islands of Puget Sound, 1906, rocks.

Parmelia physodes (L.) Ach.

Islands of Puget Sound, near Glacier, British Columbia, and near Laggan, Alberta, 1906, bark. Forms of this variable species are common in these areas.

Parmelia stygia (L.) Ach.

St. George Island, Alaska, Coll. Trevor Kincaid, 1897, Wasp Island in Puget Sound, and near Laggan, Alberta, 1906, rocks.

Peltigera venosa (L.) Hoffm.

Near Laggan, Alberta, 1906, soil.

Pertusaria multipuncta (Turn.) Nyl.

Islands of Puget Sound, 1906, bark.

Physcia aipolia (Ach.) Nyl.

Brown Island in Puget Sound, 1906, rocks.

Physcia comosa (Eschw.) Nyl.

Near Little Rock, Arkansas, Coll. Colton Russell, 1899, bark.

Physcia hispida (Schreb.) Tuck.

San Juan Island in Puget Sound, 1906, old fences.

Physcia pulverulenta (Schreb.) Nyl.

Waldron Island in Puget Sound, and near Glacier, British Columbia, 1906, rocks.

Physcia teretiuscula (Nyl.).

Gunflint, Minnesota, 1897, Hot Springs, Arkansas, Coll. Colton Russell, 1899, and Iron County, Missouri, by the same collector, 1900, rocks. Little known in North America, being usually confused with *Physcia caesia* (Hoffm.) Nyl.

Piloporus acicularis (Ach.) Th. Fr.

San Juan Island in Puget Sound, 1906, rocks.

Piloporus hallii (Tuck.).

Longmire Springs, Washington, Coll. E. T. Harper, 1906, and Olympic Mountains, Washington, Coll. T. C. Frye, 1907, rocks.

Placodium aurantiacum (Lightf.) Naeg. & Hepp.

Islands of Puget Sound, 1906, rocks and wood.

Placodium cinnabarinum (Ach.) Anzi.

Islands of Puget Sound, 1906, exposed rocks.

Placodium citrinum (Hoffm.) Leight.

Jefferson County, Missouri, Coll. Colton Russell, 1899, shaded limestone.

Placodium ferrugineum (Huds.) Hepp.

Brown Island in Puget Sound, 1906, bark.

Placodium galactophyllum Tuck.

Washington County, Missouri, Coll. Colton Russell, 1900, exposed limestone.

Placodium jungermanniae (Wahl.) Tuck.

Near Laggan, Alberta, at 7,000 to 9,000 feet, 1906, among mosses.

Placodium lobulatum (Sommerf.) Fink.

Waldron Island in Puget Sound, 1906, rocks.

Placodium murorum (Hoffm.) Ach.

Waldron Island in Puget Sound, 1906, rocks.

Placodium sideritis (Tuck.).

Waldron Island in Puget Sound, 1906, rocks.

Placodium sinapispermum (Auct.) Hepp.

Near Laggan, Alberta, 1906, rocks. Little known in North America.

Placodium ulmorum Fink.

Near LaCrosse, Wisconsin, Coll. L. H. Pammel, 1892, and Rooks County, Kansas, Coll. E. Bartholemew, 1893, bark.

Placodium vitellinum (Hoffm.) Hepp.

Waldron Island in Puget Sound, and near Laggan, Alberta, 1906, soil and rocks.

Psora crenata (Tayl.).

Laramie County, Colorado, at 7,000 feet, Coll. Mrs. C. F. Baker, 1895, soil.

Psora globifera (Ach.).
Isle Royale, Michigan, 1902, and near Glacier, British Columbia, 1906, rocks.

Psora icterica (Mont.) Fink.
Lincoln County, New Mexico, Comm. W. R. Maxon, 1902, and Gillispie County, Texas, Coll. G. Jermy, without date, soil.

Psora lurida (Sw.) Koerb.
Isle Royale, Michigan, Coll. E. T. Harper, 1904, soil.

Pyrenula cerasi (Schrad.) Hepp.
Plummers Island, Maryland, 1907, bark.

Rhizocarpon alboatrum (Hoffm.) Th. Fr.
Waldron Island in Puget Sound, 1906, bark.

Rhizocarpon alpicolum (Wahl.).
St. Paul's Island, Alaska, Coll. Trevor Kincaid, 1897, and near Laggan, Alberta, 1906, rocks.

Rhizocarpon badioatrum (Flœrke) Th. Fr.
Near Glacier, British Columbia, 1906, rocks.

Rhizocarpon geographicum (L.) Lam. & DC.
Islands of Puget Sound, near Glacier, British Columbia, and near Laggan, Alberta, 1906, rocks.

Rhizocarpon oidaleum (Tuck.).
Islands of Puget Sound, 1906, and National Park, Montana, Coll. M. E. Jones, 1910, bark, wood, and rocks.

Rhizocarpon petraeum (Wulf.) Koerb.
Islands of Puget Sound, and near Glacier, British Columbia, 1906, rocks.

Rinodina aterrima (Krempelh.) Anzi.
Near Laggan, Alberta, at 9,000 feet, 1906, rocks. A little-known plant.

Rinodina biatorina Koerb.
Plummers Island, Maryland, Coll. W. R. Maxon, 1902, and Bruce Fink, 1907, rocks.

Rinodina constans (Nyl.) Tuck.
Near Shushan, New York, Coll. Frank Dobbin, 1907, trees.

Rinodina hallii Tuck.
Islands of Puget Sound, 1906, bark.

Solorina crocea (L.) Ach.
Montana, Coll. M. E. Jones, 1902, and near Glacier, British Columbia, 1906, soil.

Speerschneidera euplaca (Tuck.) Trev.
Missouri, Coll. Colton Russell, 1900, rocks.

Sphaerophorus globiferus (L.) DC.
Islands of Puget Sound, 1906, bark.

Staurothele diffractella (Nyl.) Tuck.
Washington County, Missouri, Coll. Colton Russell, 1900, limestone.

Stereocaulon alpinum Laur.
Islands of Puget Sound, 1906, rocks.

Stereocaulon tomentosum Fr.
Islands of Puget Sound, 1906, rocks.

Sticta anthrapsis Ach.
Islands of Puget Sound, 1906, bark and rocks.
Sticta crocata (L.) Ach.
Waldron Island in Puget Sound, 1906, mossy rocks.
Sticta limbata (Turn.) Ach.
San Juan Island in Puget Sound, 1906, rocks near shore. A little-known plant in North America.
Sticta oregana Tuck.
Longmire Springs, Washington, Coll. E. T. Harper, 1906, bark.
Sticta scrobiculata (Scop.) Ach.
Waldron Island in Puget Sound, 1906, exposed sandstone.
Synechoblastus pycnocarpus (Nyl.) Fink.
Iron County, Missouri, Coll. Colton Russell, 1900, bark.
Teloschistes lychneus (Ach.) Tuck.
San Juan Island in Puget Sound, 1906, rocks and wood.
Teloschistes polycarpus (Hoffm.) Tuck.
Colorado, Coll. C. F. Baker, 1898, Utah, Coll. L. H. Pammel, 1901, and San Juan Island in Puget Sound, 1906, bark.
Thamnolia vermicularis (Sw.) Ach.
Top of Mt. Constitution in Puget Sound, at 2,000 feet, and near Laggan, Alberta, at 9,000 feet, 1906, soil and rocks.
Thelotrema lepadinum Ach.
Islands of Puget Sound, 1906, and Olympic Mountains, Washington, Coll. T. C. Frye, 1907, bark.
Urceolaria scruposa (Schreb.) Ach.
Islands of Puget Sound, 1906, rocks.
Usnea barbata Fr.
Islands of Puget Sound, 1906, trees.
Usnea cavernosa Tuck.
Islands of Puget Sound, 1906, trees.
Usnea florida (L.) Ach.
Gillespie County, Texas, Coll. G. Jermy, without date, Madison County, Missouri, Coll. Colton Russell, 1898, and Flathead Lake, Montana, Coll. M. J. Elrod, 1899, trees.
Verrucaria fuscella (Turn.) Ach.
Washington County, Missouri, Coll. Colton Russell, 1900, limestone.
Verrucaria margacea Ach.
Olga Island in Puget Sound, and near Glacier, British Columbia, 1906, rocks.
Verrucaria nigrescens Pers.
San Juan Island in Puget Sound, and near Glacier, British Columbia, 1906, rocks.

MIAMI UNIVERSITY,
OXFORD, OHIO.

A FIELD MEETING OF PATHOLOGISTS

WILLIAM A. MURRILL

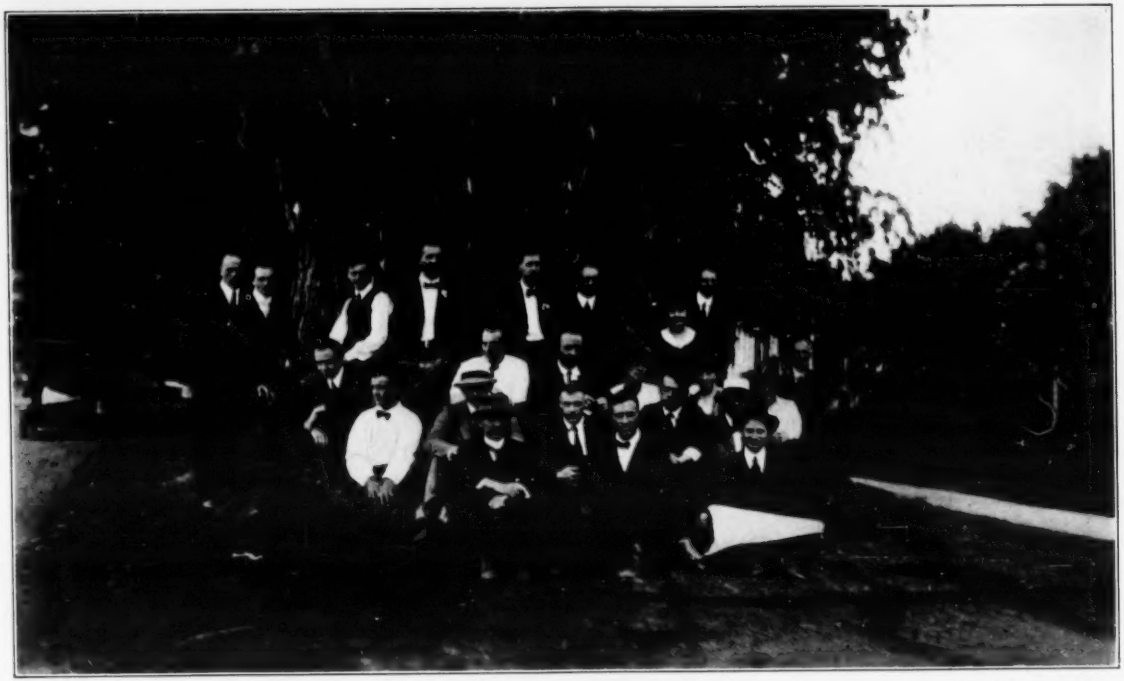
(WITH PLATE 15)

The writer was invited to represent the New York Botanical Garden at a meeting of plant pathologists and Connecticut farm bureau agents, held during the week beginning August 18 at New Haven, Storrs, and elsewhere, for the discussion of some of the most important problems now confronting the Connecticut farmers, fruit growers, and truck gardeners. About twenty botanists, mostly from New England and New York, were present; while several hundred other persons were in attendance at special meetings. The evenings were devoted to brief papers and discussions; the mornings and afternoons to automobile tours through the plantations between New Haven, Hartford, and Storrs. A distance of three hundred miles was covered in these tours, during which time the weather was most delightful.

The meeting on Monday evening at the Graduates Club of New Haven, presided over by Dr. E. H. Jenkins, was devoted to a variety of general subjects, such as "Plant Pathology and the College Course," "Closer Relations between France and America," "Entomology and Pathology," "Tropical Forestry," "The Botanical Garden and the Pathologist," and "Reminiscences of Dr. Farlow."

On Tuesday morning, various departments of the Agricultural Experiment Station were visited and then a tour made of orchards and farms showing peach and apple spraying experiments, peach yellows, potato tests, corn breeding experiments, effects of fertilizers on fungi, etc.

In the afternoon, the Yale Botanical Laboratories were inspected under the guidance of Professor Evans and Dr. Whitford; after which the party went on a long journey through the market gardens of Highwood and Westville, the Elm City Nur-



BENEATH THE WETHERSFIELD ELM

Photo by Prof. Morse

sery, and the seed farms of Orange, Milford, and Woodmont. At the nursery, Mr. Coe exhibited many dwarf trees he had brought from Japan, as well as an interesting climbing Hydrangea, excellent for walls, and the original plants and parents of the hybrid box privet, a border shrub of great promise. An hour's stop was made at Savin Rock for dinner, and then the party proceeded to the Assembly Hall of the Experiment Station for the evening meeting.

Dr. Hartley, Director of the Rhode Island Experiment Station, presided at this meeting, the general subject of which was "Tree Diseases." Dr. A. H. Graves spoke on "Resistant Chestnut Trees"; Dr. Florence McCormick on "White Pine Blister Rust"; Professor Butler and Mr. Stoddard on "Spraying Trees"; and Dr. Clinton on "Peach Yellows." Most of these talks were illustrated with lantern slides and some with microscopic mounts. It seems to be established that blister rust infects pine needles through their breathing-pores; and that peach yellows, probably an enzymatic disease, may be transmitted from one tree to another by grafting with bud or bark.

An early start was made Wednesday morning for Storrs, where the Agricultural College and Extension Bureau are located. The first stop was at the Barnes Brothers' apple, pear, and peach orchards, to see a commercial plantation of dwarf McIntosh apples; a dusting machine in operation throwing clouds of dry sulphur in the air; and a peach orchard that had been entirely renewed and probably saved from yellows by proper treatment with sodium nitrate and other fertilizers.

The largest greenhouses in America are located at Cromwell. About 22 acres are under glass, one house being 800 feet long by 82 feet in width and another 500 by 480 feet, the latter entirely filled with roses. Ferns, begonias, palms, carnations, chrysanthemums, etc., are also grown in abundance and under the very best conditions. The establishment was far too large to admit of a thorough examination, so we inspected a few of the larger houses, the storage rooms, and the packing rooms, and then continued our journey toward Hartford.

At Wethersfield, we grouped ourselves beneath the largest elm

in the United States while Professor Morse and Professor Torrey took photographs. This remarkable tree is 30 feet in circumference, 97 feet high, and 250 years old, the branches spreading 75 feet from the trunk in all directions. It stands on the edge of the highway without protection of any kind.

Elms, sugar maples, and plane-trees were the commonest roadside trees in the regions visited, many of them being old and very handsome. A sugar maple was seen at Wapping that measured 17 feet in circumference and 80 feet in height. On account of the wet season, fruit-bodies of large fungi were common on the trunks of various trees, *Fomes populinus* being often observed on sugar maples and *Spongipellis galactinus* on apple trees. Both of these polypores are white and visible at long distances. Many examples of bad tree doctoring were in evidence along the principal highways.

Lunch was taken in Hartford near the Morgan Memorial, after which we left at top speed for Storrs, finely located among the hills with a broad view of the surrounding mountains and valleys. The only dining-room in the place has a reputation for closing very promptly, hence our haste. All of the remaining daylight was utilized in inspecting the potato fields, orchards, greenhouses, dahlia garden, and botanical garden, under the guidance of Professors Slate, Hollister, Fraser, and Sinnott.

The evening session was devoted to a historical sketch of tobacco growing in Connecticut, by Dr. Jenkins, and a discussion of potato, tobacco, and market garden diseases by Messrs. Morse, Chapman, and others. Dr. Olive also discussed the relation of the botanical garden to the public.

Thursday was a very important field day, devoted chiefly to tobacco. Leaving Storrs shortly before nine, the first stop was made at East Windsor Hill to see the fields of broad leaf tobacco in that vicinity and the Haviland plantation of tent Cuban tobacco, with narrow leaves.

Considerable "rust," or "burn," was found on tobacco grown in the open. Many of the upper leaves were scalded like maple leaves on a hot day after a spell of rainy weather. Some showed small brown spots and others white spots, the latter resembling

insect work. All of these injuries may possibly have been due to the "mosaic," or "calico," disease, which renders the leaf thin and sickly, and unable to resist sudden changes in atmospheric conditions. Many plants showed yellow lower leaves, doubtless due to lack of potash or other fertilizer trouble.

Tobacco mosaic, like potato mosaic and peach yellows, is a very widespread and mysterious disease. It may be carried far and wide through the field by simply touching the leaves with infected hands. In old plants, if the lower leaves are touched, they will not take the disease, but will communicate it to the younger leaves and suckers at the top. The danger to the crop comes in handling the seedlings, which if infected develop into weaker plants of less value. When the crop is far advanced, there is little need for caution, since the sources of infection are always destroyed during the winter.

On Thursday afternoon, after an excellent lunch at Thompsonville, the Havana tobacco district at Suffield was visited and an inspection made of various experiments in progress there under the direction of Mr. Clayton. Johnson's susceptible burly, grown for comparison, was found to be badly affected with *Thielavia* root-rot, which turns the tips of the roots brown or black, while in *Fusarium* root-rot the lesions are lighter in color. These rots are readily seen after the roots have been rinsed in water.

The last stop of the day was made at the extensive tented fields of the American Sumatra Tobacco Company, where 290 acres are under cloth costing a million dollars, and 67 acres are covered by a single tent. The yield this year is enormous, probably because of the plentiful rains. After several bad years, a number of growers in the district had turned their fields out to rest or were cultivating them in corn, timothy, and other crops for a change, which seemed unfortunate in view of the present tobacco yield.

This company is transporting men, women, and children by the hundreds in motor trucks from Hartford to harvest the crop. The lower leaves are taken off, four or six at a time, as they ripen and hauled in covered baskets to the barns, where they are strung on cords fastened to sticks and hoisted into the barns to dry. In

damp weather and at critical periods a little charcoal is used. When winter comes, the tobacco is sweated, sorted, graded by experts, and packed for shipment. It brings over a dollar a pound.

The tobacco growing district of Connecticut is limited to the valley of the Connecticut River and other localities at least twenty miles from the ocean where the soil is light and rich in organic matter. A great deal of fertilizer is necessary. The seedbeds must be sterilized with great care and the best seed used. After a certain number of crops, the land must be rested and renewed by growing other crops upon it.

On Thursday evening Dr. Olive, Professor Sinnott, and the writer were the guests of Dr. Clinton, who planned the meetings and did so much to make them a success. The following list of botanists in attendance was furnished by him.

Prof. A. W. Evans and Dr. H. N. Whitford, of Yale, and Dr. A. H. Graves, formerly of Yale.

Dr. E. W. Olive, of the Brooklyn Botanic Garden.

Professors E. W. Sinnott and G. S. Torrey, of Storrs.

Professors A. V. Osmun and W. S. Krout, and Dr. G. H. Chapman, of the Amherst Agricultural College.

Prof. W. J. Morse, of the Maine Experiment Station.

Prof. O. R. Butler, of the New Hampshire Experiment Station.

Prof. M. F. Barrus, of the Cornell Experiment Station.

Dr. W. A. Murrill, of the New York Botanical Garden.

Dr. G. R. Lyman, of the Disease Survey, B. A. Porter, of the Entomological Division, and E. E. Clayton, of the Tobacco Work, of the U. S. Dept. of Agriculture.

Dr. Grace Clapp, of Smith College.

Dr. Florence A. McCormick, E. M. Stoddard, and G. P. Clinton, of the Connecticut Experiment Station.

NEW YORK BOTANICAL GARDEN.

NOTES AND BRIEF ARTICLES

[Unsigned notes are by the editor]

Owing to the increased cost of publication, the price of MYCOLOGIA *will be advanced to four dollars ($4.00) at the beginning of 1920. This price will also apply to back volumes; which can still be supplied in complete sets.*

Professor L. R. Hesler, formerly of the Department of Plant Pathology of Cornell University, is now head of the Department of Botany of the University of Tennessee, a position recently made vacant by the death of Professor S. M. Bain.

Mr. C. G. Lloyd, of Cincinnati, Ohio, spent the last week in August and the first two weeks in September at the Garden studying and photographing types of *Xylaria* and the larger species of *Hypoxylon* in the Ellis Collection, which contains numerous type specimens of North American Pyrenomycetes.

Mr. H. B. Weiss, of New Brunswick, New Jersey, is making a study of the beetles and other insects that infest fungi, and finds that the species that feed on woody fungi are usually different from those infesting mushrooms. He would be glad to receive specimens when accompanied by the correct name of the host.

Dr. W. C. Coker was actively engaged during the past summer in completing his investigation of the genus *Clavaria*. Besides devoting considerable time to library and herbarium study at the Garden and other institutions, he was able to spend several weeks in collecting at various localities in the eastern United States, from North Carolina to New England, where conditions were suitable for the development of the coral-fungi. His series of illustrations of this interesting group of fungi is excellent.

It was stated in the September number of MYCOLOGIA that Dr. C. T. Gregory had accepted a position in Norfolk, Virginia. Dr. H. S. Jackson asks me to correct this erroneous statement and to say that Dr. Gregory was retained after July 1 as extension pathologist of the Indiana Agricultural Experiment Station, having immediate charge of extension work in vegetable and truck crop diseases. He did consider a position in Virginia, but finally decided not to accept it.

The *American Journal of Botany* for July, 1919, contains a list of the publications of the late Prof. Atkinson prepared by Dr. H. M. Fitzpatrick, of Cornell University. It covers five and a half pages printed in small type. A brief sketch of his life appears in the same number. Another account appeared in the *Botanical Gazette,* contributed by Prof. Whetzel, of Cornell. The best recent photograph of Prof. Atkinson is probably the one published by Mr. Lloyd in his *Mycological Notes* for June, 1919.

Two valuable circulars were recently issued by Dr. Mel. T. Cook, of the New Jersey Experiment Station. One deals with the common diseases of herbaceous plants used as ornamentals, and the other with the diseases of shade and ornamental trees. They are both well illustrated, and contain directions for treatment in all cases. The subject of ornamentals is too often overlooked by the plant pathologist, who usually has more than he can do in attending to the wants of diseased economic plants. Here is a chance for the establishment of a fellowship for an extended investigation of the diseases of ornamental plants.

In a report on white pine blister rust control for 1918, Dr. G. P. Clinton and his associate, Dr. Florence McCormick, of the Connecticut Agricultural Experiment Station, describe a method of making artificial infections of detached leaves in Petri dishes, where they may be kept alive for weeks and closely watched, while the amount of moisture and light may be readily controlled. Leaves of trees and shrubs may be handled in this way, but herbaceous leaves are apt to wilt. In the same report, it is stated

that the blister rust enters pine trees through the stomates on their leaves, producing at first characteristic golden-yellow spots or bands.

The first specimen of *Grifola Berkeleyi* I have seen from Alabama was sent in last July by Mr. J. E. Fries, of Birmingham. This very large polypore occurs at the base of oak trees and is evidently parasitic on oak roots. It has received several names, such as *P. anax, P. lactifluus,* and *P. subgiganteus,* all of which are characteristic; but the earliest name, *P. Berkeleyi,* was assigned by Fries in 1851 to a fragment sent to him by Berkeley, who received it from Curtis in North Carolina. While in Virginia last summer, I saw an immense specimen of this fungus growing against the base of an oak on the college campus at Blacksburg, which measured fully two feet across.

A bulletin has recently been published by the U. S. Department of Agriculture treating of the rosette disease of pecan trees in the southern states. After considerable experimenting, it has been discovered that this serious disease is caused by soils deficient in humus, fertility, and moisture supply. In setting new orchards the bulletin recommends that only good land be used. Deep sand, clays underlaid with sand, and eroded hillsides should be avoided. After the orchard is planted the cultural practices should be such as to increase the depth, humus content, fertility, and moisture-holding capacity of the surface soil as rapidly as possible, and to conserve moisture during dry periods. Intercropping with shallow-rooted plants and legumes is a good practice.

Mrs. John R. Delafield collected a number of interesting fungi at Buck Hill Falls, Pennsylvania, in August and presented them to the Garden herbarium. Notes and colored drawings accompanied several of the specimens which were of particular value. The very rare *Tyromyces balsameus,* the dainty little *Prunulus cyaneobasis,* and the brilliantly-colored *Melanoleuca Russula* were among the number. Also: *Chanterel minor, C. cinnabari-*

nus, C. Chantarellus, C. infundibuliformis, Hydrocybe conica, Melanoleuca albissima, Clitocybe clavipes, Gymnopus carnosus, Lactaria torminosa, Cortinarius alboviolaceus, Tyromyces lacteus, Tremellodon gelatinosum, Hydnum velutinum, Helvella crispa, Macropodia fusicarpa, Aleuria aurantia, Otidea grandis, and many other species.

An old English walnut tree in Lynchburg, Virginia, was referred to in the last number MYCOLOGIA as having borne diseased fruits since about 1915. This walnut blight, *Bacterium juglandis,* has been known since 1900 on the Pacific coast, where it is considered a most serious disease and one not amenable to treatment. In 1913, it was reported in New York and New Jersey, and in 1916 it was found quite generally distributed in the eastern United States. During the latter year, it was observed that infection took place about the last of May, but the disease did not penetrate deeply into the tissues of the nuts until the middle of August. In California, infection occurs about flowering time and is serious if the weather is moist. The only hope of controlling this bacterial blight lies in the discovery of immune or resistant varieties.

The oldest Japanese chestnut tree on our grounds, one that has survived since the early days of the Garden, persisting through the terrible epidemic of canker which killed off all the other chestnuts, failed to put forth its leaves last spring. It is dead—killed by an attack of the canker that was almost imperceptible at first but finally proved too strong for it. This tree has been carefully observed for fourteen years, or since the canker was discovered in this vicinity. The disease gained entrance several years ago through a small branch three feet above the ground and worked away at the base of the trunk until it was completely girdled. Only one small canker was found in the top of the tree, which had a spread of twenty feet or more and remained green through the season of 1918.

Leaf-blight of the plane-tree and white oak has been unusually prevalent this season, owing to the wet weather in May. This

disease, which renders the trees so unsightly, may be controlled by sanitation, pruning, and spraying, but the process is expensive and exacting. Spraying alone will be of value if done at the proper time. Use the strongest Bordeaux mixture (5–5–50), applying it thoroughly with a power sprayer before the leaves are half grown, and repeat two or three times at intervals of a week or ten days according to the weather. This solution kills the summer spores and prevents infection of the new leaves. If the dead twigs and leaves, both on the trees and on the ground, are collected and burned, the winter spores will be killed and the disease will not appear with the opening of the buds. All the trees in a given locality should be treated at once.

In an article on the growth of wood-destroying fungi on liquid media contributed to the *Annals of the Missouri Botanical Garden* for April, 1919, by Zeller, Schmitz, and Duggar, the following conclusions are drawn:

1. Many wood-destroying fungi are not suitable for growth experiments with liquid media.

2. With respect to the media employed and to the species studied, *Merulius pinastri, Polyporus lucidus, Polystictus versicolor, Pleurotus sapidus,* and *Trametes Peckii* grow best in the order named. Others grow well only on certain media, *e. g., Lenzites vialis, Daedalea quercina,* and *Merulius lacrymans* on Richards' solution.

3. Czapek's solution with the monobasic, and Richards' solution with the mono-, di-, and tribasic potassium phosphate proved generally to be suitable media. Thus, there is a decided indication of the desirability of selecting a specific medium for each fungus.

Dr. Robert T. Morris has been collecting fleshy fungi on his country place at Stamford, Connecticut, and sending them to the herbarium of the Garden. He recently sent in a very peculiar gray form of *Venenarius solitarius,* and specimens of the rare *Melanoleuca pallida* and *Lactaria atroviridis.* He writes as follows: "I ate a good-sized piece of the *Lactaria atroviridis* and found it fairly tender, sweet, and good, with no bad effects fol-

lowing. The large colony of this species passed away before I could get your answer about edibility. I also tried a mess of *Melanoleuca pallida* and found it to be a first-rate mushroom, not in the very best class, but merely excellent." Speaking of the relation of fire to fungi, he writes: "About one hundred acres of my country place were burned over two years ago in early May, leaving several hundred chestnut stumps in the burned area. Last year *Fistulina hepatica* was more abundant on the burned stumps than on the others. This year it is very abundant on the burned stumps—sometimes three or four specimens to the stump."

DR. WILLIAM GILSON FARLOW

Dr. Farlow died at his home in Cambridge, Massachusetts, on June 3, 1919. He was born in Boston in 1844 and graduated at Harvard in 1866. He afterwards studied botany in Europe for several years, chiefly with Professor de Bary. In 1874, he became a member of the Harvard faculty, and three years later was appointed professor of cryptogamic botany, which position he held for a period of forty years.

He was a pioneer in cryptogamic botany in America, and wielded an influence through his teaching, his publications, his library, his herbarium, and his instructive and stimulating correspondence, that has scarcely been equaled. Honors were showered upon him from all parts of America and Europe, and no one more richly deserved them. The funeral services were held in Appleton Chapel and he was buried in Newton Cemetery.

All of his large collection of books and manuscripts was left to Harvard University, to constitute the Farlow Reference Library. The sum of $25,000 was left in trust to his assistant, Mr. A. B. Seymour, who will enjoy its income during his life. On his death this fund will be added to a gift of $100,000 previously made to Harvard and known as the John S. Farlow Memorial Fund. On the death of Professor Farlow's widow, $100,000 will be given to the University and added to the same fund.

W. A. MURRILL

A POLYPORE PARASITIC ON TWIGS OF ASIMINA

This species, *Inonotus amplectens,* was first described by the writer (Bull. Torrey Club **31**:600. 1904) from specimens collected by R. M. Harper on the Ocmulgee River near Lumber City, Georgia, in September, 1903. The fruit-bodies were found encircling living twigs of *Asimina parviflora.*

There are now four other specimens in the herbarium of the New York Botanical Garden. A collection was made on *A. parviflora* at Rock Springs, Orange Co., Florida, on August 28, 1909, by Mr. C. H. Baker, who stated that it was first observed by him about 1904.

Two collections were made by Mr. Baker on *A. pygmaea* in August, 1909; one near McDonald and the other near Plymouth, in Orange Co., Florida. He says that the fungus is peculiar to *Asimina,* and that the twigs on which it grows usually appear to be killed.

When Dr. G. Clyde Fisher was in Florida recently, he collected the same polypore on living twigs of *Asimina angustifolia* at Gainesville, July 29, 1919, thus adding another specimen and another host to our collection.

This interesting fungus is now known from Georgia and northern Florida, occurring on three species of *Asimina: A. parviflora, A. pygmaea,* and *A. angustifolia.*

W. A. MURRILL

AN ORANGE-COLORED PUFFBALL

Calvatia rubroflava has been collected two past seasons in the dahlia bed near the museum building of the Garden, but well-developed specimens were not obtained until brought in by Miss Eaton on August 22, evidently having grown from the same patch of mycelium. This puffball, which is easily recognized by its orange color, is very rare, although widely distributed in gardens and other cultivated places. The species was first described by Cragin in the *Washburn College Bulletin* for 1885, from specimens collected in Kansas in October. The measurements given in his description, which is copied below, are rather small, my plant being 3½ inches broad and nearly three inches high.

"*Lycoperdon rubro-flavum* sp. nov. Small, from less than an inch to an inch and a half and nearly as broad, obconic, tapering gradually downward to the rooting origin, rather than contracted into a stem-like base. Peridium thin, vanishing irregularly above, where it is orange-red to orange-brown in color, evenly rounded, and farinaceous, with scattered, low, conical spines and granules, which become blackish from greyish white; below brownish pink, naked, shining, and irregularly shrunken-rugose. Capillitium and spores olivaceous orange, the external portion having the orange tint deeper and becoming bright orange-red when exposed by the secession of the peridium. Spores subglobose, with a depression on one side, mostly non-pedicellate, smooth, very small, about .003 mm. in diameter."

W. A. MURRILL

A MEETING OF PATHOLOGISTS ON LONG ISLAND

About one hundred plant pathologists, representing many sections of America, as well as England and Holland, met on Long Island, June 24–28, to study potato diseases in the field and to discuss these and other diseases of immediate interest to farmers and horticulturists. The plans were carefully arranged by D.. M. F. Barrus; the Farm Bureau prepared charts; and many farmers loaned their cars for tours to various sections of the Island.

On Tuesday afternoon, the pathologists met in Riverhead and were welcomed by Mr. Talmage; on Wednesday, they made a tour of the North Side, returning to Riverhead for an evening meeting; on Thursday, the South Side was visited, and a meeting was held at Watermill, with addresses by Dr. Cotton, of England, Dr. Quanjer, of Holland, Dr. Pethybridge, of Ireland, and Dr. Edson, of Washington; on Friday, an inspection trip was made in Nassau County, starting from Mineola; and on Friday evening there was a conference at the McAlpin Hotel in New York City.

A meeting of Northeastern Pathologists, in charge of Prof. C. R. Orton, was held at the Brooklyn Botanic Garden on Saturday, June 28, at which potato leaf-roll, the potato wart disease, apple scab, etc., were discussed and an illustrated lecture given by Dr. Quanjer. There was also a meeting of the advisory board.

The importance of such conferences and field inspection tours cannot be overestimated. The New York Botanical Garden was represented by Dr. Seaver, Dr. Stout, and the writer.

W. A. MURRILL

BOLETI FROM CONNECTICUT

Prof. H. L. Wells, of Yale University, is well known as a chemist, but it is not so generally known that he is an ardent mycologist and mycophagist during the vacation season. He and his daughter Gertrude have sent from the vicinity of Old Lyme, Connecticut, and elsewhere a great many specimens of interesting fleshy fungi. In a letter written at Old Lyme on July 30, he says:

"In a section of the woods here is a remarkable place for boleti, and several I have not identified. I have found *B. felleus* in great abundance, also *B. indecisus*, perhaps equally abundant, which unless very young I cannot distinguish except by tasting or bruising. *B. alveolatus* and *B. bicolor* are also very common; and I have seen *B. illudens, B. scaber, B. ornatipes, B. pallidus, B. gracilis, B. subglabripes, B. punctipes, B. luridus, B. speciosus, Strobilomyces strobilaceus*, and *Boletinus pictus*, curiously rare here. *B. cyanescens* and *B. chromapes* are often common, but have not yet appeared.

"Of course, I have found many other things besides boleti. One of the most interesting was a specimen of *Amanita Caesarea*, which I have not found before in this locality. However, seventeen years ago, I found some small specimens of it at Grove Beach, Conn., and fifteen years ago two magnificent plants near Worcester, Mass.

"I have found also *Boletus Gertrudiae*, which Peck described for me, not very accurately, as the specimens always decayed before he got them, and I think I mixed up two species in my account of it to him. He said it was a very remarkable thing."

Then Prof. Wells sent specimens of *B. illudens, B. chromapes, B. griseus, B. pallidus*, and large collections of *Boletinus castanellus* and *Boletus Gertrudiae*. On July 31, he wrote as follows:

"As I happened to find about a dozen specimens of *Boletus Gertrudiae*, described by Peck about seven or eight years ago, and

not quite correctly through *my own fault,* as you are at liberty to state, I sent you a box of them to-day by parcel post, and if you think this a good species I hope you will describe it anew, as Dr. Peck wrote me he hoped to do, but did not get to it. I give you my description of it on another sheet of paper."

As this group of fungi is very difficult and can be accurately known only through careful studies of fresh specimens, I give Professor Wells' notes on *B. Gertrudiae* almost in full. He is probably the only man who is thoroughly acquainted with this species.

"Pileus nearly flat when rather young, usually becoming nearly hemispheric when older. Color at first light-brownish-yellow, usually brighter yellow toward margin, and becoming bright-yellow at maturity all over, and then often paler in the central part. Glabrous and somewhat moist to the touch, rather bright and shining. Usually 4 to 6 inches in diameter. Flesh always white until decay sets in. Tubes very small, white, and stuffed, then yellow, becoming rusty-yellow with age. Stem pure-white without and within at first, slightly reticulate, then later the top of the stem for about an inch or more becomes bright-yellow and this color extends gradually downward, without and within, as the plant grows older and finally the whole stem may become bright-yellow. The stem is solid, large, and enlarged toward the base."

This species occurs in rather dense frondose woods in many places near Old Lyme in mid-summer. The aspect of the plant is large and stout, resembling *B. edulis.* It was named for Miss Gertrude Wells, who has been an amateur mycologist since she was six years old.

W. A. MURRILL

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New names, and the final members of new combinations, are in **bold face type.**

*It has been considered unnecessary to include here the species listed in the four following articles, since they are already indexed or specially listed.

Anderson: Index to American species of Phyllosticta. See p. 66.

Fink: Additions to lichen distribution in North America. See p. 296.

Murrill: Cuban polypores and agarics. See p. 22.

Overholts: Some Colorado fungi. See p. 245.